

# Networks of Research Collaboration in China: Evidence from Nanotechnology Publication Activities, 1990-2006

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## I. INTRODUCTION

THE last two decades have witnessed dramatic growth in nano-science and nano-engineering (nano) research in China. Although recent studies have shown that China is becoming a leading nation in terms of its share of world's publication, some key questions are left unanswered. First, few studies have explored the intellectual structure of the Chinese nano community, such as where are the leading institutions, who are the leading scientists, and what are the collaboration patterns among Chinese nano scholars. Second, nano is an interdisciplinary field. Although in general China is among those top countries in nano related publication, it is still not clear in which subfields of nano research is China is aligned with, catching up, or lagging other nations. Third, although scholars note the influential impact of overseas Chinese on China's knowledge accumulation, most studies are descriptive, and little research has been conducted to test hypotheses about China's cross-national nano knowledge networks.

## II. RESEARCH QUESTIONS

Two thematic questions are examined in the article. First, what is the profile of nano research in China? Second, what is the impact of international collaboration on the quality of nano research in China?

## III. DATA SOURCE

The paper draws on a global database of publications in nano research from 1990 to 2006 (summer) recorded in the Web of Science (WoS). (For nano definition and method, see Porter, A., Youtie, J., Shapira, P., Schoeneck, D., Refining

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Search Terms for Nanotechnology, Journal of Nanoparticle Research (First Online, August 2007.) China's publications from this WoS database were extracted. Social-economic data for Chinese regions was also obtained from the National Statistics Bureau of China and merged into the dataset. Publication record fields were cleaned to address typographical or transliterated variations of names. Appendix 1 (attached) presents an example for cleaning the field of Chinese cities.

## IV. METHODOLOGY

Two methods of analysis are used in the paper:

### A. Bibliometric analysis

For the first thematic question, VantagePoint Software is used to visualize the intellectual structure of China's scientific community in the nano field: the most active regions, institutions, and leading intellectuals, and key terms cluster are identified based on their research outputs. The scientific network among the most active nano researchers, and in particular the network across borders, is also mapped via Ucinet software.

### B. Modeling

The second question is to examine the impact of international research collaboration on research quality of China.

From 1990 to 2006, Chinese scientists internationally coauthored 6928 articles in the field of nanoscience, almost 1 out of 6 articles are collected in WOS with at least 1 overseas coauthors. Among these articles, 86.39% are written in English, 13.46% in Chinese, and the rest are written in Japanese and other languages. We will test whether articles written in English are more likely to have international collaborators than those written in Chinese (we anticipate a positive finding here).

The paper then tests the following hypotheses related to whether overseas research collaboration is an important factor influencing the quality of China's nano research. To date, this has not been extensively empirically tested. Both hypotheses test whether Chinese articles with international collaborators are of higher quality than those not.

*Hypotheses 1:* Articles with international collaborators are more likely published in high ranking journals

*Hypotheses 2:* Articles with international collaborators are more likely have higher citations

